REFERENCES.

1. British Med. Jour., July 18, 1908 (quoted by Thompson and Hewlett).
2. Bloomfield, A. L.: The Circulation of Foreign Particles in the Mouth, Am. Rev. Tuberc., 1922, 5, 903.
3. Bloomfield, A. L.: The Circulation of Bacteria in the Mouth, Bull. Johns Hopkins Hosp., 1922, 33, 145.
4. Bloomfield, A. L.: The Upper Air Passages as an Environment for Bacterial Growth, Am. Rev. Tuberc., 1920, 4, 247.
5. Crowe, S. J.: The Relation of Tonsillar and Nasopharyngeal Infections to General Systemic Disorders, Bull. Johns Hopkins Hosp., 1917, 28, 1.
6. See Sanarelli: Centralbl. f. Bacteriol., 1891, 1 Abt., Bd. 19, 25. Barnes, B. S.: Tr. Chicago Path. Soc., 1907-09, 8, 249.
7. Bloomfield, A. L.: The Fate of Bacteria Introduced into the Upper Air Passages, Bull. Johns Hopkins Hosp., 1919, 30, 317.
8. See Avery, O. T.: Jour. Exper. Med., 1910, 29, 215. Fischer, Albert: Jour. Exper. Med., 1921, 24, 447.
9. Bloomfield, A. L.: The Reaction of the Saliva, Bull. Johns Hopkins Hosp., 1921, 31, 118.
10. Avery, O. T.: Jour. Exper. Med., 1919, 30, 359.
11. See Zinsser, Hans: Infection and Resistance, 2d ed., p. 13.
12. Hasslauer: Centralbl f. Bakteriol., 1900, 1 Abt. Ref., Bd. 37, 1.
13. Thompson and Hewlett: Lancet, 1890, 1, 86.
14. See Wurtz and Lermoyez: Am. des mal. de l'oreille, 1893. And Calvino, V. E. M.: Arch. Ital. di Otolog., etc., 1891, Bd. 10, 25.
15. Heuer, G. J.: Personal communication.
16. Paul, Ludwig: Ztschr. f. Hyg., 1902, 40, 468.
17. Neuninger, O.: Ztschr. f. Hyg., 1901, 38, 94.
18. Quesnil, U.: Ztschr. f. Hyg., 1902, 40, 505.
19. Chesney, A. M.: Jour. Exper. Med., 1910, 24, 387.
20. Avery, Chickering, Cole and Dochez: Monographs of the Rockefeller Institute for Medical Research, No. 7. Acute Lobar Pneumonia.
21. Blake, F. G. and Cecil, R. L. Jour. Exper. Med., 1920, 31, 403.
22. Mudd, Goldman and Grant: Jour. Infect. Dis., 1921, 34, 11.
23. Mudd, Grant and Goldmann: Jour. Infect. Dis., 1921, 29, 151.
24. Winternitz, M. C.: Jour. Exper. Med., 1919, 29, 537.
25. Olitzky, P. and Gates, F.: Jour. Exper. Med., 1921, 34, 1.
26. Bloomfield, A. L.: The Significance of Hemolytic Influenza Bacilli, Bull. Johns Hopkins Hosp., 1921, 22, 378.

TWO HUNDRED SYPHILITIC PATIENTS WHOSE CHIEF COMPLAINT WAS "STOMACH TROUBLE;" AN INTERPRETATIVE ANALYSIS OF THE DIAGNOSIS OF SYPHILIS IN CONSULTANT MEDICAL PRACTICE.

By John H. Stokes, M.D.,

professor of dermatology and syphilology, mayo foundation graduate school, university of minnesota,

and

Philip W. Brown, M.D.,

fellow in medicine, the mayo foundation, rochester, minnesota.

(From the Section on Dermatology and Syphilology, Mayo Clinic.)

Cabot, in the second edition of *Differential Diagnosis*, directed the attention of the profession to dyspepsia as a medical complaint,

In his experience cardiac disease stood at the head of the list of pathologic conditions which were expressed in the consulting room in this particular manner. Cabot gives due emphasis to the importance of an examination of the spinal fluid and of a neurologic examination of patients who may have syphilis underlying their gastric complaints without gross evidence of tabes. Contributions to the meaning of "stomach trouble" in syphilis have been made from the Mayo Clinic, particularly by Eusterman and Carman, who have dealt with various aspects of the clinical, roentgenologic, and pathologic picture of syphilitic gastric disease. It occurred to us, however, that an analysis from the standpoint of the patient rather than of the finished diagnosis might yield results of value in the general diagnostic problem of syphilis, which is our primary concern. Few items in the story of a medical case in general are of more import than the presenting symptom, and yet in certain aspects of syphilis especially, few items tell so little of the true state of affairs.

In order not to produce an artificial picture of the meaning of gastric complaint[1] in relation to syphilis seen in a diagnostic clinic, we adopted the following methods of approach. All patients considered in our survey had been shown undoubtedly to have syphilis. The search was confined to records of the Section on Dermatology and Syphilology for the years 1920–1921 during which time we have approximated our highest efficiency in the detection of the disease. More than two-thirds of the cases are from the files of 1920. All patients who presented a gastric complaint were included in the series, without any other form of selection being exercised. Of 200 patients thus included, 87 per cent were found to have rated stomach trouble as their chief complaint.

On analysis of this group of 200 cases, it appears that the majority of syphilitic patients who have gastric complaints have neurosyphilis (70 per cent). In the entire series of 200 patients, only 20 presented organic lesions of the stomach or the duodenum and only 9 presented lesions of the heart.

Many interesting sidelights on the general diagnostic problem which syphilis, especially late syphilis, presents in modern medicine developed from this study. These may be summarized as follows:

The age of the large proportion of the patients was between thirty-five and forty-five years, which previous surveys have shown to be a little earlier than the average age incidence of late syphilitic complications in general. It is in line with the experience of others who have studied syphilis statistically that a much larger proportion of men than women have neurosyphilis. Our first impressions were similar. Chart 1A suggests this preponderance of men over women. But if a chart is constructed to represent the number of each sex with

[1] By gastric complaint we mean that the patient included in his voluntary account of his symptoms, such items as vomiting, nausea, pain in the stomach, indigestion, burning and belching and stomach trouble.

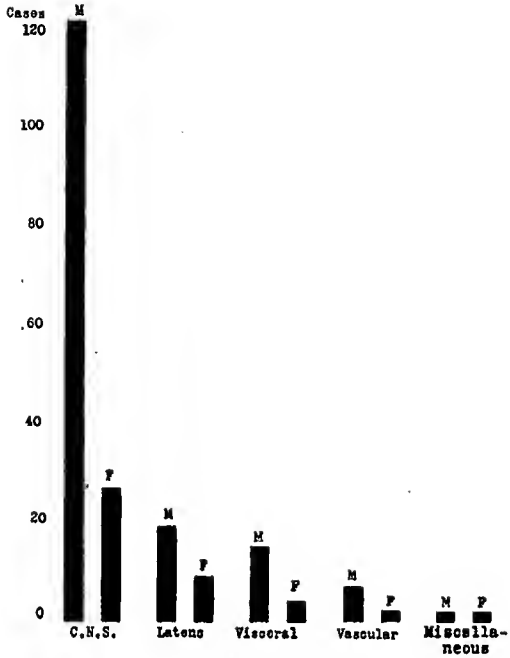

CHART I A

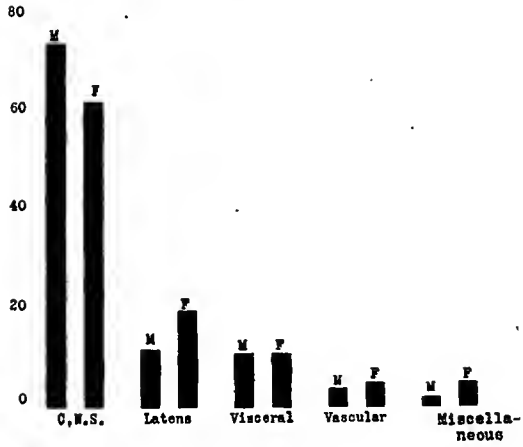

CHART I B

a special type of manifestation in comparison with the number of the same sex presenting themselves with syphilis (Chart 1B), the difference between the sexes is seen to be more apparent than real. We believe that this form of statistical error is more common than is generally realized.

The history of syphilis is the conventional first approach to a diagnosis of the disease in ordinary practice. If the patient denies infection, investigation often goes no further. The fallibilities of this approach cannot be too often emphasized. As compared with men, women give a history of syphilis in the later years of the disease in a proportion of only 1 to 2.5, or somewhat more than one-third as often. The proportion of men who had no recognizable secondary lesions was 60 per cent, of women 70 per cent. Inability to obtain a history of secondaries, then, is evidently of small value in eliminating syphilis. In a general way all late syphilis may be traced to failure to recognize or adequately to treat the primary phase of the disease. The chancre was apparently correctly diagnosed in only 62 per cent of 109 male patients who gave a history of a suspicious primary lesion. The number of female patients who gave a history of chancre was too small for satisfactory comparison. This percentage of correct diagnosis of the primary lesion closely approximates an estimate of 70 per cent, recently obtained by us in patients with early primary and secondary syphilis who had been under observation by physicians before they came to the Clinic. It suggests that a diagnosis is made in only two-thirds of patients with syphilis who consult physicians early in the disease, and that even with modern diagnostic aids the average has not strikingly improved. Of the 60 per cent of our patients who gave suspicious histories, only 36 per cent had had diagnoses of syphilis before coming to the Clinic.

How was syphilis identified in this group of 200 patients who entered a medical and surgical clinic for the relief of stomach trouble? The patients were divided into two groups, those whose diagnosis had been made before entry, and those in whom it had been made afterward. The necessary data on diagnoses elsewhere were obtained from only 134 (Table I). The percentage of positives in the 200 cases is much higher on some items because of the inclusion of cases excluded from the two preceding groups by lack of complete information on the diagnosis made elsewhere.

It was a matter of surprise to us that gastric syphilis, detectable by clinical and roentgenologic criteria, played so small a part in the final evaluation of a complaint of stomach trouble in clinical syphilis.

It is evident that the history of infection and the positive blood Wassermann reaction rank high in making a diagnosis of syphilis in general medical practice. The examination of the spinal fluid on the other hand, evidently of so much importance in our own identification of syphilis, plays little part in diagnosis elsewhere. Only

10 per cent of patients in the entire series had had an examination of the spinal fluid before entering the Clinic. About 50 per cent of the patients identified as syphilitic by neurologic signs only, had gastric crises with negative spinal fluid and negative blood Wassermann reactions.

TABLE I.—BASIS FOR DIAGNOSIS OF SYPHILIS IN 134 CASES OF GASTRIC COMPLAINTS.

	Diagnosed elsewhere 60 cases, per cent.	Not diagnosed elsewhere 74 cases, per cent.	All cases (200) after examination in Clinic, per cent.
History of infection	90	31	60.0
Positive blood Wassermann	65	56	44.0
Positive spinal fluid	6	44	59.0
Negative blood Wassermann and positive spinal fluid	5	28	41.0
Neurologic signs only	7	9	16.0
Gastric syphilis	1.5	3	4.0
Osseous syphilis	3	0	1.5
Vascular syphilis	3	0	4.5
Miscellaneous	1	5	3.0
Probably non-syphilitic (duodenal and gastric ulcers)	6	8	6.0

In a surprisingly small proportion stomach trouble was owing to something more or less obviously non-syphilitic, such as a duodenal or gastric ulcers. The very striking proportion of improvements obtained under treatment further supports the belief that demonstrable organic non-syphilitic lesions play only a small part in stomach trouble among syphilitic patients.

Analysis of the Blood Wassermann Findings. It is very evident that in the practice of the Mayo Clinic it is useless to expect late syphilis to yield in the aggregate more than 50 per cent of positive blood Wassermann reactions to aid in the diagnosis of the disease. This percentage has been repeatedly approximated in various surveys which we have undertaken. It has been a matter of some concern to learn the reason for this relatively low proportion of positives in order to decide whether or not the extensive use which we make of the examination of the spinal fluid is justified. An analysis of the results of Wassermann reactions in our series showed quite definitely that the 56 per cent of patients on whom we were unable to obtain positive blood Wassermann reactions in routine examinations were either intrinsically negative, or patients who had been subjected to treatment as soon as their positive reactions were discovered elsewhere, and later came to us with blood negative to the Wassermann test. A considerable proportion of patients who were negative to the Wassermann test on the blood, had positive spinal fluids. That this proportion of positive spinal fluids is materially higher than that of positive bloods is, we believe, evidence of the fundamental importance of the examina-

tion of the spinal fluid in the clinical study of late syphilis, and of its applicability to a variety of the problems of internal medicine in which a concealed and blood-Wassermann-negative syphilis may be a factor. Our experience suggests that when there is a reasonable suspicion of syphilis, such as is afforded by a history of a genital lesion, or when there are suspicious neurologic findings, the examination of the spinal fluid may be much more important than the gastric analysis and the roentgenogram which too often constitute the extent of the study. Certainly if the clinicians who examined our patients with stomach trouble, had been hidebound to a test meal and symptomatic study of these cases, or had been relieved of their suspicions with regard to syphilis by negative Wassermann reactions, many of the patients included in this series would have left the Clinic with their fundamental ailment unrecognized (Table II).

TABLE II.—81 PATIENTS WHO HAD HAD WASSERMANN TESTS ELSEWHERE.

Wassermann reaction on blood.	Treated outside the Clinic.	Not treated outside the Clinic.
Positive elsewhere; positive in Clinic	5	7
Negative elsewhere; positive in Clinic	2	10
Positive elsewhere; negative in Clinic	27	3
Negative elsewhere; negative in Clinic	22	5

112 PATIENTS WITH "STOMACH TROUBLE" AND NEGATIVE WASSERMANN REACTIONS ON THE BLOOD.

	Recently treated.	Not recently treated.	Total.
Negative Wassermann reaction on the blood; no examination of spinal fluid	7	1	8
Negative Wassermann reaction on the blood; positive spinal fluid	30	42	72 (69.2 per cent)
Negative Wassermann reaction on the blood; negative spinal fluid	16	16	32 (30.7 per cent)

It is evident that the large proportion of our negative-blood-Wassermann reactions are obtained on treated patients, and that positive reactions are not infrequently obtained in patients who have been negative elsewhere. If then we are to make a sound objective diagnosis of syphilis, we must resort to the spinal fluid examination, which will yield 64 per cent positives when the blood, for one reason or another, is negative and fails to confirm our suspicion. The detailed analysis of the treatment status of the blood-Wassermann-negative patients is contained in Table II. Fifty-nine patients who had not been treated recently, nevertheless, had negative Wassermann reactions on the blood. These, therefore, are the true or intrinsic negatives. Of these intrinsically negative patients 42 (70 per cent) had positive spinal fluids. It is evident, therefore, that

from this angle also the spinal fluid examination assumes an exceedingly important place in the making of the diagnosis.

Estimating on the basis of 59 true negatives, we find that our Wassermann procedure, when not affected by treatment, should yield approximately 60 per cent positives, instead of the 44 per cent which we actually obtain under the conditions in which we are practising. With the very high proportion of tabetic neurosyphilis, and especially of gastric crises in the series, this is a reasonable proportion of positive results. Gennerich's estimate, one of the most recent for tabetic neurosyphilis, is 60 to 70 per cent positives on the blood in the first decade of the disease.

It is evident, therefore, that the conditions of consultant practice as we meet them cannot be satisfied by the use of the blood Wassermann reaction alone, which is already yielding us about as high a proportion of positive results as could be expected under the conditions. The spinal fluid, therefore, which shows evidence of neurosyphilis after the blood Wassermann reaction has become negative, is absolutely essential to the successful working out of the problem presented by late syphilis with gastric symptoms (Table III).

TABLE III.—INTERRELATION OF BLOOD AND SPINAL FLUID FINDINGS IN 177 PATIENTS WHO COMPLAINED OF "STOMACH TROUBLE".

Wassermann reaction on the blood positive; spinal fluid negative	41	(23 per cent)
Wassermann reaction on the blood negative; spinal fluid positive	72	(41 per cent)
Wassermann reaction on the blood positive; spinal fluid positive	32	(18 per cent)
Wassermann reaction on the blood negative; spinal fluid negative	32	(18 per cent)

32 PATIENTS WITH NORMAL BLOOD AND SPINAL FLUID WHO COMPLAINED OF "STOMACH TROUBLE".

Neurologic signs	26
Vascular signs (aortic regurgitation and aortitis)	2
Condition proved by therapeutic tests	3
True gastric syphilis	1

Again, it is apparent what an important role patients with negative Wassermann reactions on the blood and abnormal spinal fluids play in our work.

Few lessons are more important for the clinician who uses the examination of the spinal fluid as a diagnostic aid to learn than that a negative blood and a normal spinal fluid do not eliminate from the diagnosis the gastric crises of tabetic neurosyphilis. Of our 32 patients with normal bloods and spinal fluids 13 (40 per cent) had clinically typical gastric crises. Eleven of the 13 had definite neurologic signs of tabetic neurosyphilis. In the other 2 the diagnosis was based on the clinical course and history alone. While it is not within the scope of this paper to discuss the nature and location of the central lesion giving rise to the gastric crisis, we have been strongly impressed with the idea that in a considerable proportion of the cases, at least, the process involves the vagus, the

sympathetic mechanism, the splanchnic nerves, and the large abdominal ganglia rather than the cord.

Gastric Findings as Such. Having shown in a general way what the Wassermann reaction and the spinal fluid examination have contributed to clarifying the complaint of stomach trouble in 200 syphilitic patients, the results of the statistical compilation of the direct examination of these patients' stomachs may now be discussed. Test meals were given in 122 cases, and roentgenographic studies were made in 131 (Table IV).

TABLE IV.—TEST MEALS IN 122 SYPHILITIC PATIENTS WITH "STOMACH TROUBLE".

Normal acidity 40 to 60	47 (38 per cent)
Hyperacidity 60 and above	14 (11 per cent)
Hypoacidity 40 and below	61 (50 per cent)

ROENTGENOGRAPHIC FINDINGS IN 131 SYPHILITIC PATIENTS WITH "STOMACH TROUBLE".

Negative roentgenogram	110 (84.0 per cent)
Duodenal ulcer	11 (8.4 per cent)
Gastric syphilis	4 (3.0 per cent)
Questionable pyloric lesions	4 (3.0 per cent)
Cardiospasm	1 (0.8 per cent)
Gastric ulcer	1 (0.8 per cent)

Eusterman has directed attention to the hypoacidity of the stomach which is the seat of syphilitic lesions as such, so that this finding will not be discussed from the standpoint of its mechanism. Wile (quoting Neugebauer) found hypoacidity in 62 per cent of cases of early syphilis, but nothing characteristic in late syphilis, although a majority of cases tends toward hypoacidity.

It would seem that the routine roentgen-ray examination of syphilitics who complain of stomach trouble does not yield a large percentage of positive results. We make no attempt to discuss the details of these findings, which are covered by Eusterman's work on gastric syphilis (Table IV).

The "Neuro" Group. About 10 per cent of the 200 syphilitic patients who complained of stomach trouble had received a diagnosis of gastric neurosis, neurasthenia, functional disorder of the stomach and so forth, before complete studies of the case from the syphilologic standpoint were made. The diagnosis of latent syphilis was in some cases appended to that of neurosis when the evidence for syphilis from the general standpoint seemed especially strong (Table V).

TABLE V.—21 "NEUROTICS" WITH "STOMACH TROUBLE" WHO HAD SYPHILIS.

Wassermann reaction on the blood positive	7
Wassermann reaction on the blood positive; spinal fluid positive	4
Wassermann reaction on the blood negative; spinal fluid positive	8
Wassermann reaction on the blood negative; spinal fluid negative; neurologic signs positive	2

There is no more dangerous practice in general diagnostic medicine than to make a final diagnosis of neurosis in the presence of evidence of syphilis, without a full investigation. Half of the "neurotic" patients in our series had positive blood Wassermann reactions and more than half had positive spinal fluids. Every "neuro" deserves at least a Wassermann test, and if there is reasonable additional presumptive evidence of syphilis, an examination of the spinal fluid.

True Gastric Syphilis. Inasmuch as the scope of this paper is limited to the consideration of the complaint of stomach trouble, in its relation to the general problem of syphilologic diagnosis, we omit consideration of the cases of gastric syphilis which appear in our series.

The Surgical Relation of Stomach Trouble to the Diagnosis of Syphilis. The series of 200 patients included 35 on whom needless operations had been performed because of various aspects of syphilis, leading to the complaint of stomach trouble. Twenty-seven of these patients had been operated on elsewhere, and 8 after entering the Clinic. Five of the 35 had sustained two operations without relief, and we were even confronted with 1 who had sustained four operations without relief. It is evident that the problem of the patient with late syphilis with a visceral syndrome and a complaint which suggests something operable, is a serious one, both from the standpoint of the patient and of the surgeon who wishes to reduce his percentage of error to the lowest possible terms. We have not included in this group of patients operated on those whose definitely non-syphilitic lesions were diagnosed before operation, found, and removed at operation with relief of symptoms. Such operations must obviously be as frequent and necessary in the syphilitic patient as in the non-syphilitic. Our plea, however, is for a fuller recognition of the extraordinarily misleading influence of syphilis in the production of "operable complexes," and the usual futility of such operative interventions as are attempted without an adequate diagnostic study.

Table VI illustrates the fact that in almost none of the cases in our series was syphilis so entirely latent or occult that it could have been omitted reasonably from a complete diagnostic appraisal of the case.

In all but 2 of 35 cases, then, there was some clue available to direct the suspicion of the diagnostician and surgeon toward syphilis. The question of the advisability of operation in the presence of reasonable grounds for suspecting syphilis will be discussed.

In Table VI the patients subjected to operation are divided into two distinct types; in the first group, the symptoms of neurosyphilis were largely upper abdominal in character and led to operation for supposed gall-bladder conditions and gastric lesions. We may fairly say these operations were unnecessary, and would have been avoided had an intensive study of the case been made with reference

to syphilis, and a therapeutic test been carried out. On the other hand, the second group of patients presents a problem in which we believe the surgeon should have right of way over the syphilographer. One of us (Stokes) has proposed that when after a careful study the question of malignancy is raised in the face of a concomitant syphilis, the most important move is the surgical exploration, which will clinch the diagnosis and afford the patient the promptest and best prospect of relief. Table VI indicates that this issue is by no means theoretic, and that the diagnostician will not infrequently be obliged to call for exploration in the presence of symptoms suggesting visceral syphilis, but from which the possibility of operable malignancy can only be eliminated by exploration. We do not believe that there is any excuse for subjecting a patient who may have an operable malignant lesion to the delays of treatment for syphilis before operation.

TABLE VI.—SURGICAL EXPLORATIONS WITHOUT RELIEF ON 200 PATIENTS WITH SYPHILIS WHO COMPLAINED OF "STOMACH TROUBLE".

	One operation.	Two operations.	Three operations.	Four operations.
Patient admits early syphilis with definite physical signs	13	1	0	0
Patient denies early syphilis with definite physical signs	14	4	0	1
Patient admits early syphilis but without definite physical signs	2	0	0	0

35 PATIENTS WITH SYPHILIS WHO HAD BEEN OPERATED ON FOR "STOMACH TROUBLE" WITHOUT RELIEF.

Gastric crises in tabetic neurosyphilis	11
Other types of neurosyphilis	16
Gastric syphilis (question of malignancy)	3
Hepatic syphilis (question of malignancy)	3
Latent syphilis with gastric symptoms relieved by treatment	2

As the obverse of this point of view, we submit the principle that patients with inoperable or presumptively inoperable abdominal malignant lesions, from whom a suspicion of syphilitic infection can be obtained, should be given the benefit of treatment for syphilis. It may further be advantageous to apply such tests to admittedly benign lesions of the abdominal viscera in which there is reason to suspect concomitant syphilis, before proceeding to operation. This should be especially true in gastric lesions in which an ulcer is recognizable, since syphilitic ulcer of the stomach is a well established entity, and the effect of gastro-enterostomy on a patient with a syphilitic ulcer is by no means as desirable as the resolution of the ulcer under treatment for syphilis.

Brief abstracts of a few of the cases in our series suggest some of the aspects which syphilis presents to the internist or surgeon who

is confronted with symptoms which seem to indicate the need for an exploratory or other operative interference.

CASE I (A350913).—Miss C. H., aged twenty-nine years, gave as her chief complaint "stomach distress." There was no history of syphilis. A palpable mass could be identified in the epigastrium. The test-meal showed marked hypoacidity, and the roentgenologist's report was inoperable carcinoma of the stomach. The blood Wassermann reaction was strongly positive; the spinal fluid negative. There was considerable cachexia. Inasmuch as the carcinoma of the stomach was considered inoperable, the patient was placed on treatment for syphilis and was given three injections of arsphenamin. The patient had not shown any appreciable improvement with the amount of treatment for syphilis and a reconsideration of the operative possibilities in the case then led to an exploration. An inoperable condition of the stomach was found, but tissue was removed and the pathologic report was: "Repeated examinations negative for carcinoma. Many giant cells. Syphilis?." The patient was unable to remain for further treatment for syphilis.

This case well illustrates the principle that operability should have the right of way over treatment for syphilis whenever surgeon and internist believe that an operable carcinoma is present with concomitant syphilis.

CASE II (A300769).—Mrs. F. M., aged thirty-one years, complained chiefly of nausea and vomiting. Physical examination was negative, except for slight pain in the region of the gall-bladder. No roentgenograms were taken. The blood Wassermann reaction was positive. A preoperative diagnosis of cholecystitis was made. On exploration the gall-bladder and appendix were found to be normal and were not removed. Treatment for syphilis was instituted with the prompt and complete disappearance of all symptoms.

CASE III (A129487).—Mr. J. F., aged thirty-six years, complained chiefly of stomach trouble. A history was obtained of probable syphilitic infection, but there were no definite neurologic signs. A clinical diagnosis of exophthalmic goiter was made, followed by ligation of the thyroid artery. Apparently as an afterthought a Wassermann test was made and found to be positive. After the resection of part of the thyroid the patient was sent home on mercury pills and potassium iodid and instructed to return later for thyroidectomy, the syphilis being apparently regarded as of too little importance for further consideration. Five years later the patient returned. He had sustained no relief whatever from the thyroidectomy and his stomach trouble was worse than at the time of his first examination. He now presented marked neurologic signs which made a diagnosis of tabetic neurosyphilis with gastric

erises uneseapable. The blood Wassermann reaction and the spinal fluid examination were both negative. He declined to remain for treatment.

This type of ease well illustrates the unfortunate results of ignoring the gravity of syphilis as a complieation, and dismissing the patient with inadequate treatment, only to have late neurosyphilitic complieations develop through neglect. Had adequate treatment been instituted when the positive blood Wassermann reaction was first found, the patient would have been none the worse for the diagnostie error at least.

Case IV (A368057).—Mrs. A. B., aged fifty-three years, gave eaneer of the stomaeh as her chief complaint. There was no history of syphilis. The gastrie eontents were hyperaeid. Roentgenograms of the stomaeh were not made. The blood Wassermann reaetion was strongly positive. There was a palpable mass in the upper right abdomen. A preoperative diagnosis of panereatic eyst was made and exploration was done without previous speeifie treatment. The stomaeh, panereas, and gall-bladder were found to be normal. The liver was studded with "tumors." The pathologie report on one of these tumors was ehronie hepatitis. After the operation speeifie treatment was instituted, and was followed by rapid and pronounced improvement.

So far as our observations on surgical intervention in the group of syphilitie patients under consideration are concerned, we are impressed with the fact that the surgeon and the diagnostician think mueh too seldom of syphilis as a factor in their work and, like the profession at large, are too easily satisfied with superfieial and ineonelusive evidenee of its absenee. In the phrase whieh one of us (Stokes) has often used, their "index of suspieion is too low." Very often even the blood Wassermann reaetion is not invoked to assist in the diagnosis, and if it is, a single negative return seems to elear the field for operative intervention. It may be safely said that as long as internists and surgeons explore for chronie abdominal symptoms without a very serious reekoning with the possibility of syphilis in general, and neurosyphilis in partieular, just so long will there be a liberal margin of diagnostie blunder in this field. Sueh a reekoning with syphilis, we are now learning, must not stop with the merely routine precaution of a Wassermann test on the blood, whieh in the very type of ease in whieh operation is least desirable, is apt to be the most deceptive and inadequate of guides. The neurologie examination and the spinal fluid test will, if intelligently applied at the demand of a syphilologieally suspieious and alert mind, greatly reduee the incidence of negative explorations in neurosyphilitie patients.

Moreover, unless confronted with an emergency, or with evidence strongly suggesting a malignant process, it is a mistake for the surgeon to ignore the positive Wassermann reaction in his patient before exploration. An examination of the spinal fluid has more than once disclosed in patients under consideration for operative intervention, a condition of affairs in distinct contraindication to surgery until the syphilis had been brought under control.

Results of Treatment for Syphilis. Not all the patients in whom a final diagnosis of syphilis was made, remained under our treatment for their syphilitic infections. Table VII shows the results in 109 patients who were treated with greater or less thoroughness. All patients whose improvement was slight or doubtful for any reason are eliminated, so that the results represent substantial benefit, amounting in many instances to complete arrest of the symptoms and a restoration to working efficiency.

TABLE VII.—THE EFFECT OF TREATMENT FOR SYPHILIS ON 109 SYPHILITIC PATIENTS COMPLAINING OF "STOMACH TROUBLE".

	Improved.	Not improved or indefinite.
Neurosyphilis in general	51 (73 per cent)	19
Neurosyphilis, with neurologic signs only	6 (55 per cent)	5
Neurosyphilis, signs and positive spinal fluid	41 (79 per cent)	12
Neurosyphilis, gastric crises of tabes dorsalis	10 (62 per cent)	6
Latent syphilis, Wassermann reaction on the blood positive	13 (67 per cent)	6
Therapeutic tests in gastric syphilis with a question of malignancy	3 (100 per cent)	0

The average outlook for improvement following treatment for syphilis that may be expected in syphilitic patients who complain of stomach trouble is, then, approximately 70 per cent. Forty-three per cent of the 109 patients were considered to be very markedly improved and seemed in good condition. Thirty-five per cent showed some improvement and amelioration of symptoms. Twenty-three per cent failed to respond to treatment, or if there was response it was too indefinite to be considered beneficial. We shall make no attempt at this point to go into the complex questions of serologic versus clinical and symptomatic improvement in patients of this type. We call attention, however, to the really very presentable outlook for some degree of improvement in patients with gastric crises, whose notorious tradition of resistance to treatment forms one of the discouragements of syphilotherapy.

The therapeutic indications for each syphilitic patient with a gastric complaint must be judged, of course, on the merits of the case, and little can be expected of haphazard, slipshod, or inadequate treatment which does not meet the pathologic lesion underlying the patient's complaint. Case V, for example, illustrates the futility of following up a suspicion of syphilis with ineffective and partial treatment, not directed at the underlying condition.

CASE V (A87594).—Mr. F. H., aged thirty-four years, complained chiefly of vomiting spells. He gave a history of early syphilis. Physical examination was negative. A test meal showed hyperacidity; roentgenograms of the stomach were negative. Pupils were sluggish to light but not fixed. Serum Wassermann reaction was negative. A preoperative diagnosis of chronic cholecystitis and chronic appendicitis was made and verified at operation. Relief of symptoms did not follow the operation, however, and the patient was then given two injections of arsphénamine "on suspicion", but without appreciable result. Seven years after operation, he returned stating that he had had no relief from his symptoms. The blood Wassermann reaction at this time was again negative, but a spinal fluid examination showed positive evidence of syphilis of the nervous system. A diagnosis of tabetic neurosyphilis with gastric crises was made and systematic intensive treatment with arsphenamine and mercury resulted in striking improvement.

If, in view of his history of infection and sluggish pupils, a spinal fluid examination had been resorted to in the face of a negative Wassermann reaction at the time of operation, this patient's tubes could probably have been completely arrested. The two arsphenamine injections given to satisfy a feeling that something ought to be done for the suspected syphilis accomplished nothing for the patient, although the fact that his crises were unmenable to treatment was subsequently demonstrated.

A patient who owes his gastric symptoms to syphilis of the nervous system requires not routine treatment, or treatment for gastric syphilis as such, but treatment for syphilis of the nervous system. To apply therapeutic methods, adapted to gastric syphilis, or to syphilis of the nervous system, with the prompt and vigorous use of arsphenamine as soon as the diagnosis is made, to a patient with syphilis of the cardiovascular system, would be exceedingly risky, not to say fatal. Proper controls in the form of examinations of the spinal fluid and the application of special methods, such as intraspinal treatment when indicated, are a part of the treatment of neurosyphilis with gastric symptoms. More transient improvement of subjective complaints under a routine amount of treatment by an inexperienced practitioner is not a substitute for the well planned system which aims to secure a permanent result.

We suggest as a matter of some interest, the possibly coincidental but from the symptomatic standpoint none the less striking improvement of patients with definitely recognizable gastric lesions of a non-syphilitic character, such as duodenal ulcer, which do not respond objectively to treatment for syphilis. This response suggests interesting speculations with regard to a possible neurotrophic origin for certain of these lesions in syphilitic patients. In our series were 8 cases of duodenal ulcer and 3 of gastric ulcer, all but 1 of which were diagnosed by the aid of roentgenograms and the history.

From a syphilologic standpoint, 6 were classified as latent syphilis, 1 as possible syphilitic gastric ulcer, and 4 as "neurosyphilis." In all, specific treatment was instituted and no particular attention was directed toward a definite ulcer regime. Two of the patients with duodenal ulcer came to operation before relief was obtained. In the remaining 9 cases, operations were not performed and all the patients were greatly relieved from their gastric symptoms, reporting "excellent", "85 per cent better", and "much better."

It is of course impossible to evaluate fairly the relative worth of the various diagnostic methods employed in our investigations of the meaning of stomach trouble in our group of 200 syphilitic patients with this complaint. It interested us, somewhat, however, to tabulate the proportion of positive results obtained in these patients by the various methods of objective clinical approach employed after they had entered the Clinic with their complaints of stomach trouble (Table VIII). It would obviously be unfair to give to such a procedure as the provocative test and Wassermann series employed in 10 cases, with positive results in 9, a higher rating than the spinal fluid employed, for example, in 177 cases.

TABLE VIII.—ROUGH ESTIMATION OF THE WORTH OF CERTAIN FORMS OF EXAMINATION IN TERMS OF POSITIVE RESULTS OBTAINED IN THE STUDY OF 200 SYPHILITIC PATIENTS WITH "STOMACH TROUBLE."

Procedure	Patients.	Positive results per cent.
Spinal-fluid examination	177	59.0
Blood Wassermann tests	200	45.5
Neurologic examination	140	22.0[1]
Roentgen-ray studies	132	16.0[2]
Provocative and Wassermann series	10	90.0

[1] Includes only those with negative blood and spinal fluid and otherwise negative except for the neurologic signs.

[2] Findings of duodenal ulcer, gastric ulcer, etc., are included in this percentage.

This tabulation does not suggest to us so much the comparatively small yield, so to speak, from some of the procedures whose necessity cannot be denied, as it does the urgent need for an extension of current conceptions of what constitutes a proper clinical study of a patient with a gastric complaint who presents a reasonable suspicion of syphilis. What constitutes a reasonable clinical suspicion of syphilis has been all too little considered. It seems safe to say that clinicians and surgeons in general, to judge by the operative record of our cases, may allow themselves considerably more latitude in suspecting syphilis in patients with abdominal symptoms. Where grounds for suspicion are present, they should call for complete investigation of their cases by syphilologic methods before they proceed to a diagnosis or to treatment. We must contend perforce, from

the results of our study of this and other series of cases, that the single Wassermann test and a negative history of early manifestations cannot be regarded as synonymous with adequate syphilologic examination. They merely serve as guides to a more acute and penetrating suspiciousness of mind. That penetrating suspiciousness is coming to demand, more and more, a complete examination of the spinal fluid, with a neurologic study, before operation is resorted to in doubtful cases.

Summary. 1. Of 200 syphilitic patients who complained of stomach trouble, 70 per cent had neurosyphilis. 20 patients (10 per cent) had organic lesions (syphilitic or non-syphilitic) of the gastro-intestinal tract, 9 (5 per cent) had lesions of the heart, and only 4 per cent had true syphilis of the stomach.

2. The history of syphilitic infection is unreliable. Men give such a history three times as often as women. Sixty per cent of the men and 70 per cent of the women could not give histories of secondaries. Only two-thirds of those with histories of infection were diagnosed in the primary stage.

3. In only 36 per cent of the whole series of patients was syphilis recognized before they came to the Clinic.

4. The medical diagnoses made before their examination in the Clinic were apparently largely based on history (90 per cent) and blood Wassermann reaction (65 per cent). After examination in the Clinic the diagnoses were based most often on history (60 per cent), spinal fluid examination (59 per cent), and blood Wassermann reaction (44 per cent).

5. Only 10 per cent of the patients had had spinal fluid examinations before they entered the Clinic, yet 59 per cent were positive. The test deserves greater popularity.

6. Only 44 per cent of the patients gave Wassermann positive reactions on the blood when they entered the Clinic and 56 per cent gave negative reactions largely as a result of treatment elsewhere. The greater diagnostic importance of the spinal fluid examination is again suggested.

7. Seventy per cent of the patients with persistently Wassermann-negative bloods not due to treatment had positive spinal fluids.

8. Negative blood Wassermann and negative spinal fluid do not exclude neurosyphilis as a cause of gastric complaints. Of 32 such patients, 40 per cent had gastric crises with neurologic evidence of tabes dorsalis.

9. We suggest that the seat of the lesion in patients with gastric crises and negative spinal fluid examinations is in the vagus, the abdominal ganglia, and the sympathetic system.

10. Fifty per cent of 122 patients had hypoacidity and 38 per cent were normal. Hyperacidity was rare.

11. Of 132 patients having roentgen-ray examinations 84 per cent

were negative and only 6 per cent showed definite or doubtful syphilitic lesions.

12. "Gastric neurosis" and "functional stomach" are dangerous diagnoses, if any suggestion of syphilis is present. In 50 per cent of these cases blood Wassermann reactions were positive, and in more than 50 per cent the spinal fluids were positive.

13. Eighteen per cent of our patients with stomach trouble had had needless operations, 80 per cent before entering the Clinic. In all but 2 of 35 patients there were clues to the underlying syphilis, which were not followed up, or a negative blood Wassermann reaction that had been accepted as final, when other evidence of syphilis could have been found.

14. One-third of the needless laparotomies were on patients with gastric crises.

15. When the question of operable malignancy is raised, exploration should precede a therapeutic test for syphilis. If there is no reasonable probability of an operable malignancy being present, or if the lesion appears inoperable with syphilis present, treatment for syphilis should precede operation.

16. A general raising of the "index of suspicion" for syphilis, among internists and surgeons, would reduce operative mistakes in patients with abdominal symptoms. A blood Wassermann test is often insufficient to clarify the situation, but should at least be routine.

17. Surgeons should not ignore positive Wassermann reactions obtained before operation.

18. The results of treatment for syphilis in 109 cases in which patients remained for treatment were gratifying. Seventy per cent improved, 43 per cent were relieved of their complaint.

19. Treatment for syphilis underlying a gastric complaint must be directed according to the special indications in the case, and must not be merely general. Different methods will be required for underlying syphilis of the nervous system, the stomach, or the heart for example.

20. We observed striking symptomatic improvement in certain cases of gastric and duodenal ulcer in neurosyphilitic patients in whom the roentgen ray after treatment showed the lesions itself to be still present.

21. The spinal fluid examination stands out from this investigation as a procedure of the highest importance, outranking the serum Wassermann reaction in diagnostic syphilology as applied to internal medicine. Its wider use for diagnosis should be developed with proper facilities for its performance and control.

BIBLIOGRAPHY.

1. Cabot, R. C.: Differential diagnosis. 2 ed. Philadelphia, 1915, p. 253.
2. Carman, R. D.: Syphilis of the stomach in its roentgenologic aspects. Am. Jour. Syph., 1917, 1, 111.

3. Easterman, G. B.: Syphilis of the stomach, a report of forty cases. Am. Jour. Syph., 1918, 2, 205.
4. Gennerrich, W.: Die Syphilis des Zentralnerven Systems. Berlin, 1921, p. 109.
5. Stokes, J. H.: The problems of syphilis in general diagnosis. Journal-Lancet, 1920, 40, 457.
6. Stokes, J. H.: Principles underlying the therapeutic test for syphilis. Med. Clin. North America, 1921, 5, 480.
7. Wile, U. J.: Visceral syphilis. Syphilis of the stomach. Arch. Dermat. and Syph., 1920, 1, 543.

THE SAFEGUARDING OF THE TONSIL AND ADENOID OPERATION:

The Prevention and Treatment of Some of the Post-operative Complications of this Operation.*

By George Fetterolf, M.D.,
Philadelphia, Pa.

The sequelæ of the tonsil and adenoid operation which will be discussed in this communication are the following:

1. Temperature elevation.
2. Increase of arthritic symptoms.
3. Edema of the palate and uvula.
4. Hemorrhage.
5. Middle-ear inflammation.
6. Acidosis.
7. Pulmonary abscess.

1. **Temperature Elevation.** This condition, frequently associated with a degree of tachycardia which is out of proportion to the pyrexia, is very often found. The height ranges from 99° to 101°, rarely going higher unless there is some definite focal lesion, such as an infected middle ear. It may last one day, rarely more than two, and is so common that it usually is unnecessary to attach any importance to it, with the exception that no patient with a mouth temperature of over 99.5° should be allowed to leave the hospital.

In order to get definite figures, I took the charts of 25 private patients consecutively operated upon at the University Hospital and averaged the temperature figures. I selected the highest recorded temperature the day of the operation, the day after the operation and the day following that. The following is the result:

On the day of operation the average high temperature was 98.6°.

* Read before the Section of Otology and Laryngology of the College of Physicians of Philadelphia as part of a Symposium on "Safeguarding Tonsillectomy," December 21, 1921.